

Unstable Leidenfrost Drops on Roughened Surfaces

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Abstract

Drops placed on a surface with a temperature above the Leidenfrost point float atop an evaporative vapor layer. In this fluid dynamics video, it is shown that for roughened surfaces the Leidenfrost point depends on the drop size, which runs contrary to previous claims of size independence. The thickness of the vapor layer is known to increase with drop radius, suggesting that the surface roughness will not be able to penetrate the vapor layer for drops above a critical size. This size dependence was experimentally verified: at a given roughness and temperature, drops beneath a critical size exhibited transition boiling while drops above the critical size were in the Leidenfrost regime. These Leidenfrost drops were unstable; upon evaporation down to the critical size the vapor film suddenly collapsed.

1 Introduction

The video includes all necessary information and is available in large and small sizes.